ARCTIC RESEARCH PROGRAM OPPORTUNITIES

Program Announcement
NSF 98-72

OFFICE OF POLAR PROGRAMS

Annual Target Dates: February 15 and August 1

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INTRODUCTION

The National Science Foundation (NSF) invites U.S. scientists to submit proposals for research in all of the Arctic and to perform arctic research based at institutions in the United States.

The goal of the NSF Arctic Research Program is to gain a better understanding of the Earth's biological, geological, chemical, and sociocultural processes, and the interactions of ocean, land, atmosphere, biological, and human systems. Arctic research is supported at NSF by the Office of Polar Programs (OPP) (http://www.nsf.gov/od/opp), as well as by a number of other disciplinary programs within the Foundation that are linked through an internal NSF Arctic Affiliates system. This system, consisting of program representatives from other NSF programs that support arctic research, provides coordination across NSF, including a structure that enables joint review and funding of arctic proposals, as well as mutual support of special projects with high logistical costs.

OPP offers focused multidisciplinary and interdisciplinary programs that emphasize the uniqueness of the Arctic for special scientific studies. Models indicate that the arctic regions are among the most sensitive to environmental change. They have a long natural climate record and thousands of years of human settlement. This interplay provides a unique basis for integrated research on global systems and human adaptation.

OPP disciplinary interests encompass the atmospheric, biological, earth, ocean, and social sciences. Interdisciplinary research in the biosciences, geosciences, and social sciences is linked in the Arctic System Science Program. In addition to supporting research on long-term human-environment interactions, OPP encourages the study of contemporary socioeconomic, cultural, and demographic issues in the changing political environment of the post-Cold War world. The OPP also encourages bipolar research, especially glaciology, permafrost, sea ice, ecology, and aeronomy. Increasing emphasis is being given to the integration of research and education. Scientific programs connected to students (K-12 and above), affected communities in the north, and the general public's improved understanding of basic research are strongly encouraged. Educational components are encouraged with proposed research in all disciplines and programs, but stand-alone proposals will also be entertained.

The United States Arctic Research and Policy Act of 1984 defines the Arctic as all areas north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas including the Arctic Ocean and the Beaufort, Bering, and Chukchi Seas, and the Aleutian chain. Field projects falling outside these boundaries but directly related to arctic science and engineering conditions or issues, such as laboratory and theoretical studies, are appropriate.

The Foundation is one of twelve Federal agencies that sponsor or conduct arctic science, engineering, and related activities. As mandated by the Arctic Research and Policy Act of 1984, Federal interagency research planning is coordinated through the Interagency Arctic Research Policy Committee (IARPC) which is chaired by NSF.

Under an agreement with the U.S. Navy, access to a nuclear submarine is available annually for research in the Arctic Ocean. Researchers are strongly encouraged to pursue this possibility with OPP or directly with Office of Naval Research (ONR). Further information on other agency programs is presented in the journal *Arctic Research of the United States* (NSF 96-130), and the *U.S. Arctic Research Plan* and its biennial revisions (NSF 97-148).

As the Arctic is the homeland of numerous Native peoples, special attention must be given to all aspects of research and education that may potentially impact their lives. An interagency statement of "Principles for the Conduct of Research in the Arctic" has been developed and all arctic research grantees are expected to abide by these guidelines. These guidelines are presented in the appendix section of this program announcement.

In fiscal year 1997, NSF supported 362 Arctic research projects for a total of $49.39 million. Of this, $30.71 million was from the OPP Arctic Research Program.

A compilation of all NSF arctic and related research grants for each fiscal year is available (NSF 97-78 or www.nsf.gov/cgi-bin/getpub?nsf9778 for FY 1996). The current NSF *Guide to Programs* (NSF 97-150 or www.nsf.gov/cgi-bin/getpub?gp) should be consulted for additional program information.

RESEARCH PROGRAMS

Listed below are the principal OPP programs that support arctic research. There are three integrated programs in OPP: Arctic Natural Sciences, Arctic Social Sciences, and Arctic System Science. Support is also provided for data and information management research activities. These programs and their components are described below.

Arctic Natural Sciences Program

The OPP Arctic Natural Sciences Program supports research in glaciology and in the atmospheric, biological, earth, and ocean sciences. This program provides core support for disciplinary research in the Arctic and coordinates its support of arctic research with the Directorates for Geosciences and Biological Sciences. Areas of special interest include: marine and terrestrial ecosystems, atmospheric chemistry, exploration of the Arctic Ocean, as well as Arctic geological and glaciological processes.

Atmospheric Sciences

Research in arctic atmospheric sciences focuses on stratospheric and tropospheric processes as well as arctic climate and meteorology. Research on past climates and atmospheric gases as preserved in snow and ice cores have also been supported as has research on atmosphere-sea and atmosphere-ice interactions.

In upper atmospheric and space physics, research interests include auroral studies, atmospheric dynamics and chemistry as well as magnetosphere-ionosphere coupling. Conjugate studies are considered jointly with the Antarctic Aeronomy and Astrophysics Program.

Biological Sciences

OPP supports projects that emphasize understanding of the adaptation of organisms to the arctic environment. Biological studies in the Arctic include: research in freshwater, marine, and terrestrial biology; organismal adaptation to the arctic environment; ecology; ecosystem structure and processes; and the biological consequences of ultraviolet radiation. OPP also participates in the Life in Extreme Environments (LExEN) initiative (NSF announcement 97-157).

Earth Sciences

Research supported by OPP includes all sub-disciplines of terrestrial and marine geology and geophysics. Special emphasis is placed on understanding geological processes important to the arctic regions and geologic history dominated by those processes.

Glaciology

The OPP is the focal point for glaciological research within the Foundation. Glaciological research is concerned with the history and dynamics of all naturally occurring forms of snow and ice, including

seasonal snow, glaciers, and the Greenland ice sheet. The Arctic Natural Sciences Program also includes ice dynamics, modeling, glacial geology, and remote sensing studies of ice sheets.

Ocean Sciences

The goal of oceanographic research in the Arctic is to develop knowledge of the structure of the Arctic Ocean and adjacent seas, their physical and biological interactions with the global hydrosphere, and the formation and persistence of the arctic sea-ice cover. Areas of special interest are: the distribution of life in high latitude oceans; low temperature life processes; the formation, movement, and mixing of arctic water masses; the growth and decay of sea ice; the exchange of salt and heat with the Atlantic Ocean and the Bering Sea; geographical anomalies; sedimentary history and the role of the Arctic Ocean and adjacent seas in global climate. Proposals concerned with the interdependencies of chemical and physical processes and marine organisms and productivity are encouraged.

Arctic Social Sciences Program

The OPP Arctic Social Sciences Program encompasses all social sciences supported by NSF. These include anthropology, archaeology, economics, geography, linguistics, political science, psychology, sociology, and related subjects.

Although unsolicited proposals in any of the social sciences mentioned above are welcome, areas of particular interest include: rapid social change (including the processes and consequences of social, economic, and cultural change), community viability (including issues related to community and/or cultural vitality and survival), and human/environment interactions (including issues related to subsistence and sustainable development).

The Arctic Social Sciences Program especially encourages projects that: include indigenous peoples; are circumpolar and/or comparative; integrate social and natural sciences; involve collaborations between researchers and those living in the Arctic; include traditional knowledge; or form connections among disciplines, regions, researchers, communities, and/or students (K-12, undergraduate, or graduate).

Projects involving research with human subjects must ensure that subjects are protected from research risks in conformance with the Common Rule (*Federal Policy for the protection of Human Subjects,* 45 CFR §690). Before issuance of an NSF award, all projects involving human subjects must either have approval from the organization's Institutional Review Board (IRB) or identify the applicable subsection exempting the proposal from IRB review, as established in section 101(b) of the Common Rule. Submission of the IRB approval form or indication of exemption should be included in Section I of the proposal (see *Grant Proposal Guide* NSF 98-2, page 14). Section I should also include letters describing any other permission or approval, such as from Native organizations or communities in which the work will take place.

The Arctic Social Sciences Program considers joint review and funding with other NSF and OPP programs, when appropriate. Special funding opportunities may also be available through NSF's Environment and Global Change activities (see "Crosscutting Areas of Research and Education" in *Guide to Programs* (NSF 97-150) or the Arctic System Science (ARCSS) Program (refer below).

Arctic System Science (ARCSS) Program

The ARCSS Program supports interdisciplinary research, whose goal is to 1) understand the physical, geological, chemical, biological and sociocultural processes of the arctic system that interact with the total Earth system and thus contribute to or are influenced by global change, in order to 2) advance the scientific basis for predicting environmental change on a seasonal-to-centuries time scale, and for formulating policy options in response to the anticipated impacts of global change on humans and societal support systems. In order to achieve the goals of ARCSS an emphasis is placed on four scientific thrusts: understanding

global and regional impacts of the arctic climate system and its variability; determining the role of the Arctic in global biogeochemical cycling; identifying global change impacts on the structure and stability of arctic ecosystems; and establishing the links between environmental change and human activity.

ARCSS directs most available support to large integrated research projects that are proposed and implemented in response to science plans developed by the scientific community through Science Steering Committees (SSCs) for each component of ARCSS. However, global change proposals from individual investigators or small groups of investigators are also welcome.

ARCSS has three linked components for which proposals are encouraged: 1) Ocean/Atmosphere/Ice Interactions (OAII); 2) Land/Atmosphere/Ice Interactions (LAII); and 3) Paleoenvironmental Studies. The third component has had two projects: Paleoclimates from Arctic Lakes and Estuaries (PALE) and Greenland Ice Sheet Program Two (GISP2). Paleoenvironmental proposals are now considered within the Earth System History initiative of the United States Global Change Research Program (NSF 97-161). ARCSS further develops a fourth component: Human Dimensions of the Arctic System (HARC). The HARC science plan is accessible through the World Wide Web home page of the Arctic Research Consortium of the US (ARCUS), http://www.arcus.org, and the NSF Web Page should be consulted for new developments. In all these components proposals for new and different research topics are encouraged.

ARCSS also supports the integration of research results across components within ARCSS as well as with any other Arctic research program through a Synthesis, Integration and Modeling Studies (SIMS) effort. Science plans approved by each SSC and examples of projects supported within each component and SIMS are accessible either on the World Wide Web site maintained by the ARCSS Data Coordination Center of the University of Colorado National Snow and Ice Data Center, http://arcss.colorado.edu/ or the ARCUS home page.

Successful proposals have been funded by the Office of Polar Programs, the Divisions of Atmospheric Sciences and Ocean Sciences within the Directorate for Geosciences, by the Division of Environmental Biology, Directorate for Biological Sciences and, in some cases jointly with ONR, NASA, and DOE.

The Arctic system consists of physical, biological, and cultural factors that may respond to global change. Some models that predict the climatic response to global change show greater change in the Arctic than any other region. The predicted climatology, however, may not consider the largely unknown interannual variability in the Arctic. The presence of cultural institutions in a region subject to possibly large perturbations, however, makes it important that scientists better understand interactions of the global and Arctic systems. Therefore, the research supported in ARCSS extends beyond purely observational studies to those studies that predict and analyze the consequences of global change important to wise stewardship of renewable resources and development of policy options for resource managers and residents.

In order to focus on the Arctic system at a scale that incorporates the multiple environmental feedback mechanisms involved, large interdisciplinary projects that integrate major elements of the system will be supported.

For more information on how a research proposal might best fit the programs and themes of ARCSS, contact the program manager.

OTHER ARCTIC SUPPORT

Arctic Research and Policy

OPP supports the management of arctic data and information, including development of the Arctic Data Directory (ADD). The Arctic Data Directory (ADD) is accessible on the World Wide Web (http://www.ak.wr.usgs.gov/aedd/history.html), and contains information on several hundred arctic data

sets. The objective of this type of support is to make arctic data and information more readily available to researchers. Proposals to integrate data and information management are especially encouraged.

Arctic Logistics

An arctic logistics budget component has been established in the OPP to address field program requirements beyond those commonly included in proposals from an individual or small group of investigators. Examples of the type of logistic and research support that may be provided through the separate logistics component dependent on the site, include: ski-equipped heavy-lift aircraft, research vessels, multi-investigator helicopter or aircraft use, large remote field camps, day-use fees at major Arctic research sites where NSF has established a support structure (currently, Toolik Field Station, Barrow, and Prudhoe Bay/Deadhorse, AK, Kangerlussuaq and Thule, Greenland), and special transportation needs required for arctic research or available at the sites listed above.

There are two types of logistics support: Type 1) routine requirements typically included in proposals from an individual or small group are dealt with by the P.I., and included in the cost budget, and Type 2) coordinated requirements such as those listed above and supplied by an OPP contractor or cooperating agency are arranged in cooperation with the NSF program manager; these costs are not included in the individual investigator's proposal budget. All investigators proposing research projects that may require such support are encouraged to contact the appropriate program manager or the NSF Arctic Logistics Coordination Specialist to determine if they are eligible for Type 1 or Type 2 logistics support. Type 2 support will require completion of the Logistics Coordination Form (appendix 2).

There are special requirements for field work in Greenland. Principal investigators contemplating work in Greenland should obtain the Danish Polar Center application form for research in Greenland. It is available on the World Wide Web at http://www.dpc.dk/Sites/KVUG/US-applicationform.htm1. A copy of the application should be included with the proposal submitted to OPP.

SPECIAL PROGRAMS

The Guide to Programs (NSF 97-150) provides guidance regarding special funding opportunities including international cooperative activities, human resources development and other programs. Described below are some of these opportunities that are supported by the OPP Arctic Program. For details about these programs and other programs refer to the Guide to Programs; the NSF Home Page (http://www.nsf.gov), or the NSF publications noted below.

Small Grants for Exploratory Research (SGERs)

These awards are intended to provide support for small scale exploratory, high-risk research involving preliminary work on untested ideas, ventures into emerging areas, or research having severe urgency etc. Proposers are strongly encouraged to contact the cognizant program officer before submission.

Small Business Innovation Research Program (SBIRs)

The Small Business Innovation Research Program (NSF 97-64) primarily facilitates research on advanced concepts in scientific or engineering areas, particularly where the research may serve as a base for technological innovation. Polar topics of interest include cold-weather design, remotely operated and autonomous vehicles and sensors, geophysical and space technologies, biotechnology, and long-term operations and construction. Technical projects relating to rural communities, including sanitation, water purification, heating, clothing and construction, as well as culturally relevant educational curriculum products are considered.

Education and Human Resource Development Opportunities

The Arctic Research Program of the OPP is committed to educational and human resource development. Many opportunities exist, primarily through programs in or joint funding with the Education and Human Resources Directorate (EHR). Information about specific programs may be found in the Guide to Programs (NSF 97-150), the NSF Home Page (http://www.nsf.gov), as well as the Elementary, Secondary, and Informal Education (ESIE) Program Announcement (NSF 97-20) and the Undergraduate Education (DUE) Program Announcement (NSF 97-29). Some of the grant and supplement programs supported by the Arctic Research Program are listed below.

Research Grant Programs

Knowledge and Distributed Intelligence (KDI)
KDI is a Foundation-wide effort designed to catalyze the growth in computer power, connectivity, content, and flexibility that is so fundamental that it is dramatically reshaping relationships among people and organizations, and quickly transforming our processes of discovery, learning, exploration, cooperation, and communication. Deadline for KDI submissions is April 1 for Letter of Intent and May 8 for full proposal submission (for details see the KDI Home Page, http://www.nsf.gov/kdi).

Life and Earth's Environment (LEE)
LEE is a broad theme describing activities that focus on interdependencies among living organisms and their environment. Emphases may change from year to year, but for FY 99 they include:

LExEN, (NSF 97-157 or http://www.nsf.gov/pubs/1997/nsf97157/nsf97157.txt) interdisciplinary research program that explores the relationships between microorganisms and the environments within which they exist, with a strong emphasis upon those life-supporting environments that exist near the extremes of planetary conditions. In addition, the Life In Extreme Environments program will explore planetary environments in our own solar system and beyond to help identify possible sites for life elsewhere.

- Environmental Observatories
- Global Change
- Engineered Systems
- Urban Communities
- Integrated Research Challenges

Doctoral Dissertation Research
Dissertation grants are available in all OPP disciplines as part of the OPP Arctic Research Program. This support covers travel, fieldwork expenses, data management and other costs connected with doctoral research projects. Proposals are limited to 10 pages and are submitted by the dissertation advisor with the student as co-investigator (Co-PI). Contact the relevant program officer for more information.

Research Experience for Undergraduates Sites (REUs)
REU Site Awards provide opportunities for undergraduate students to participate in research projects that support at least six students. The annual submission deadline for the REU Sites Program is September 15.

Faculty Early Career Development Program (CAREER)
This program (NSF 97-91) is a Foundation-wide activity that supports junior faculty within the context of overall faculty development. It supports combined research and education activities. Deadline for CAREER submissions is July 22 (for details see the NSF Home Page, http://www.nsf.gov under "cross-cutting programs").

Increasing Participation of Underrepresented Populations
NSF supports a number of activities directed at attracting students to science and engineering from underrepresented groups and increasing the numbers of women (e.g., Professional Opportunities for Women in Research and Education, NSF 97-91), and persons with disabilities (NSF 91-54 and NSF 97-85) who are full participants in the mainstream of the Nation's research activities.

Supplements to Existing OPP Grants

Research Experiences for Undergraduates (REU) supplements to existing grants in support of one or two undergraduate students in on-going research can be requested at any time. Contact the relevant OPP program officer for more information.

Informal Science Education (ISE) Supplements for Public Understanding of Research. These supplements (of up to $50,000 to existing NSF research grants) are intended to inform the general public about the content, process, and relevance of state-of-the-art research (see NSF 97-70). Interested PIs with active research grants should contact their program officer for information about requirements for these supplements and procedures for applying.

High School Teacher/Student Arctic Research Experience. In conjunction with the Education and Human Resources Directorate (EHR) researchers with on-going Arctic projects can volunteer to host a high school teacher/student pair and include them in a research program. Funding is in the form of supplements made to existing grants.

World Wide Web Supplements. Small supplements designed to fund the dissemination of Arctic research results to a general audience through the World Wide Web may be available for existing grants. Contact the relevant OPP program officer.

HOW TO PREPARE PROPOSALS

Before writing a proposal send for a copy of the Foundation's booklet, *Grant Proposal Guide* (NSF 98-2), or consult the NSF Web page (www.nsf.gov). This booklet gives the format for proposals, lists the budget items that may be supported, explains the proposal evaluation process, and summarizes responsibilities of the grant recipient. Copies of the GPG or the NSF Proposal Forms Kit (NSF 98-3) may be ordered from :

NSF Clearinghouse
PO Box 218
Jessup, MD 20794-0218
Telephone: 301-947-2722
e-mail: pubs@nsf.gov

Contact a program manager in your scientific discipline if you have further questions, especially concerning specific annual program opportunities or consult the NSF Home Page (www.nsf.gov) for new announcements of research opportunities.

Who May Submit

The National Science Foundation supports researchers affiliated with U.S. universities, research institutions or other organizations, including local or State governments. All applications must be submitted by the sponsoring institution. In accordance with Federal statutes and regulations and NSF policies, no person on grounds of race, color, age, gender, national origin or disability shall be excluded from receiving assistance from the National Science Foundation. The Foundation strongly encourages women, minorities and persons with disabilities to submit proposals to all programs. Arctic research that addresses Native concerns and involves Native collaboration and training is particularly encouraged.

OPP Target Dates and Proposal Submission

In 1998 the OPP Arctic program will have two target dates for submission of proposals: April 1 and August 1. In subsequent calendar years the target dates will be February 15 and August 1. Proposals for workshops, exploratory research (SGER) or dissertation improvement grants can be submitted at any time.

Proposals for field programs requiring research support in the categories listed on the Logistics Coordination Form (appendix) must be submitted with sufficient lead time to ensure scheduling and availability. Proposals requesting those logistics capabilities must be submitted no later than the February 15 (April 1 in 1998) target date of the calendar year preceding that in which the research will be conducted. Proposals requiring an oceanographic research vessel must be submitted to either the Division of Ocean Sciences by February 15 of the year preceding the proposed cruise dates or to the OPP Arctic Program by the February 15 (April 1 in 1998) target date to allow 9 months pre-cruise notification. A minimum 9 month advance notification is required for research vessel clearances for Russian waters. Proposals for field work not requiring research support capabilities listed on the Logistics Coordination Form must be submitted no later than the August 1 target date of the preceding year.

For More Information

For further information about activities mentioned in this announcement, contact the corresponding office listed below, or visit the OPP Home Page (http://www.nsf.gov/od/opp) on the World Wide Web.

The Office of Polar Programs
(703) 306-1030

Arctic Sciences Section
(703) 306-1029

Antarctic Sciences Section
(703) 306-1033

Other Support

Other NSF programs supporting arctic research have varied deadlines or target dates. Contact specific programs for these dates and refer to the NSF Bulletin for announcements of program deadlines and target dates. The NSF Bulletin and other publications are available through e-mail.

Proposal Submission

For hard copy submissions, the original and 20 copies must be received by the target dates. Proposals must be mailed and addressed as follows:

Announcement No_____ or NSF Program_____.
National Science Foundation PPU, Room P60
4201 Wilson Blvd
Arlington VA 22230.

Proposals should be prepared in accordance with instructions in the brochure, Grant Proposal Guide (NSF 98-2). This brochure includes application forms which may be photocopied. It can be obtained from your institution's research office or from the NSF Forms and Publications Office, (703) 306-1130. Proposals may also be submitted electronically using the NSF FastLane system for electronic proposal submission and review, available through the World Wide Web at the FastLane home page (http://www.fastlane.nsf.gov). In order to use NSF FastLane to prepare and submit a proposal you must use a browser that supports multiple buttons and file upload (e.g., Netscape 2.0 and above for Windows, UNIX, or Macintosh). In addition, Adobe Acrobat Reader is needed to view and print forms, and Adobe Acrobat 3.0 (or Adobe Exchange or Distiller) is needed for creating PDF files. To access the FastLane Proposal Preparation application, your institution needs to be a registered FastLane institution. A list of registered institutions and the FastLane registration form are located on the FastLane home page.

Collaborative proposals can be submitted by two or more institutions. These proposals should all be identical, and should contain copies of all budgets, biographical sketches, other support statements, prior support, and of all cover sheets. Each institution should submit its own set. Twenty copies of the lead institution proposal, and five copies of the other institution(s) proposals are needed.

MERIT REVIEW PROCESS

Proposals submitted in response to this program announcement will be subject to the new merit review criteria approved by the National Science Board on March 28, 1997 (NSB 97-72 or http://www.nsf.gov/cgi-bin/getpub?nsbmr975). The new merit review criteria are:

What is the intellectual merit and quality of the proposed activity?

The following are suggested questions that the reviewer will consider in assessing how well the proposal meets this criterion. Each reviewer will address only those questions which he/she considers relevant to the proposal and for which he/she is qualified to make judgments.

How important is the proposed activity to advancing knowledge and understanding within its own field and across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

The following are suggested questions that the reviewer will consider in assessing how well the proposal meets this criterion. Each reviewer will address only those questions which he/she considers relevant to the proposal and for which he/she is qualified to make judgments.

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

GRANT ADMINISTRATION

Awards made as a result of this document are administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions," or FDP-III, "Federal Demonstration Partnership General Terms and Conditions," depending on the grantee organization, or "Cooperative Agreement General Terms and Conditions." Copies of these documents are available from the "Grants and Awards" section of the NSF home page http://www.nsf.gov/home/grant.htm, and at no cost from the NSF Forms and Publications Unit, which may be contacted via telephone at (703) 306-1130 or Internet at pubs@nsf.gov. More comprehensive information is contained in the Grant Policy Manual (NSF 95-26) effective October 1, 1995. The complete text of the GPM is now available on the World Wide Wed (http://www.nsf.gov:80/bfa/cpo/gpm95/start.htm).

GENERAL INFORMATION

The Foundation provides awards for research in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research related programs described here. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF projects. See the program announcement or contact the program coordinator at (703) 306-1636.

Privacy Act and Public Burden. The information requested on proposal forms is solicited under the authority of the National Science Foundation Act of 1950, as amended. It will be used in connection with the

selection of qualified proposals and may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees; to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers, and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. See Systems of Records, NSF 50, Principal Investigators/Proposal File and Associated Records, and NSF-51, 60 Federal Register 4449 (January 23, 1995). Reviewer/Proposal File and Associated Records, 59 Federal Register 8031 (February 17, 1994). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Gail McHenry, Reports Clearance Officer, Division of Contracts, Policy, and Oversight, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230.

The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing impairment to communicate with the Foundation about NSF programs, employment, or general information. To access NSF TDD, dial (703) 306-0090; for FIRS, 1-800-877-8339.

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P.T.:22
K.W.: 1008004, 1008000
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(Replaces NSF 95-133)

Appendices

Appendix 1: Principles for the Conduct of Research in the Arctic

Introduction

All researchers working in the North have an ethical responsibility toward the people of the North, their cultures, and the environment. The following principles have been formulated to provide guidance for researchers in the physical, biological, behavioral, health, economic, political, and social sciences and in the humanities. These principles are to be observed when carrying out or sponsoring research in Arctic and northern regions or when applying the results of this research.

This statement addresses the need to promote mutual respect and communication between scientists and northern residents. Cooperation is needed at all stages of research planning and implementa*tion in projects that directly affect northern people.* Cooperation will contribute to a better understanding of the potential benefits of Arctic research for northern residents and will contribute to the development of northern science through traditional knowledge and experience.

These "Principles for the Conduct of Research in the Arctic" were prepared by the Interagency Social Science Task Force in response to a recommendation by the Polar Research Board of the Na*tional Academy of Sciences and at* the direction *of* the Interagency Arctic Research Policy Committee. This statement is not intended to replace other existing Federal, State, or professional guidelines, but rather to emphasize their relevance for the whole scientific community. Examples of similar guidelines used by professional organizations and agencies in the United States and in other countries are listed in the publications.

Implementation

All scientific investigations in the Arctic should be assessed in terms of potential human impact and interest. Social science research, particularly studies of human subjects, requires special consideration, as do studies of resources of economic, and social value to Native people. In all instances. it is the responsibility of the principal investigator on each project to implement the following recommendations.

1. The researcher should inform appropriate community authorities of planned research on lands, waters, or territories used by or occupied by them. Research directly involving northern people should not proceed without their clear and informed consent. When informing the community and/or obtaining informed consent, the researchers should identify:

a. all sponsors and sources of financial support;

b. the person in charge and all investigators involved in the research, as well as any anticipated need for consultants, guides, or interpreters;

c. the purposes, goals, and time-frame of the research;

d. data-gathering techniques (tape and video recordings, photographs, physiological measurements etc.) and the uses to which they will be put;

e. foreseeable positive and negative implications and impacts of the research.

2. The duty of researchers to inform communities continues after informed consent has been obtained. Ongoing projects should be explained in terms understandable to the local community.

3. Researchers should consult with and, where applicable, include communities in project planning and implementation. Reasonable opportunities should be provided for the communities to express interests and to participate in the research.

4. Research results should be explained in non-technical terms and, where feasible, should be communicated by means of study materials that can be used by local teachers or in displays that can be shown at local community centers or museums.

5. Copies of research reports, data descriptions, and other relevant materials should be provided to the local community. Special efforts must be made to communicate results that are responsive to local concerns.

6. Subject to the requirements for anonymity, publications should always refer to the informed consent of participants and give credit to those contributing to the research project.

7. The researcher must respect local cultural traditions, languages, and values. The researcher should, where practicable, incorporate the following elements into the research design:

a. use of local and traditional knowledge and experience;

b. use of the languages of the local people;

c. translation of research results, particularly those of local concern, into the languages of the people affected by the research;

8. When possible, research projects should anticipate and provide meaningful experience and training for young people.

9. In cases where individuals or groups provide information of a confidential nature, their anonymity must be guaranteed in both the original use of data and in its deposition for future use.

10. Research on humans should only be undertaken in a manner that respects their privacy and dignity:

a. Research subjects must remain anonymous unless they have agreed to be identified. If anonymity cannot be guaranteed, the subjects must be informed of the possible consequences of becoming involved in the research.

b. In cases where individuals or groups provide information of a confidential or personal nature, this confidentiality must be guaranteed in both the original use of data and its deposition for future use.

c. The rights of children must be respected. All research involving children must be fully justified in terms of goals and objectives and never undertaken without the consent of the children and their parents or legal guardians.

d. Participation of subjects, including the use of photography in research, should always be based on informed consent.

e. The use and deposition of human tissue samples should always be based on the informed consent of the subjects or next of kin.

11. The researcher is accountable for all project decisions that affect the community, including decisions made by subordinates.

12. All relevant federal, state and local regulations and policies pertaining to cultural, environmental, and health protection must be strictly observed.

13. Sacred sites, cultural materials, and cultural property cannot be disturbed or removed without community and/or individual consent and in accordance with federal and state laws and regulations.

In implementing these principles, researchers may find additional guidance in the publications listed below. In addition, a number of Alaska Native and municipal organizations can be contacted for general information, obtaining informed consent, and matters relating to research proposals and coordination with Native and local interests. Please contact the program director for Social Sciences at NSF's Office of Polar Programs.

Publications

*Arctic Social Science: An Agenda for- Action. Na*tional Academy of Sciences, Washington, D.C., 1989.

Draft Principles for an Arctic Policy. Inuit Circumpolar Conference, Kotzebue, 1986.

Ethics. Social Sciences and Humanities Research Council of Canada, Ottawa, 1977.

Nordic Statement of Principles and Priorities in Arctic Research. Center for Arctic Cultural Research, Umea, Sweden, 1989.

Policy on Research Ethics. Alaska Department of Fish and Game, Juneau, 1984.

Principles of Professional Responsibility. Council of the American Anthropological Association, Washington, D.C., 1971, rev. 1989.

The Ethical Principles for the Conduct of Research in the North. The Canadian Universities for Northern Studies, Ottawa, 1982.

The National Arctic Health Science Policy. American Public Health Association, Washington, D.C., 1984.

Protocol for Centers for Disease Control/lndian Health Service Serum Bank. Prepared by Arctic Investigations Program (CDC) and Alaska Area Native Health Service, 1990. (Available through Alaska Area Native Health Service, 255 Gambell Street, Anchorage, AK 99501.)

Indian Health Manual. Indian Health Service, U.S. Public Health Service, Rockville, Maryland, 1987.

Human Experimentation. Code of Ethics of the World Medical Association (Declaration of Helsinki). Published in *British Medical Journal,* 2:177, 1964.

Protection of Human Subjects. Code of Federal Regulations 45 CFR 46, 1974, rev. 1983.

Appendix 2: ARCTIC LOGISTICS COORDINATION INFORMATION

The following information will be used to identify requirements at NSF/OPP-maintained logistics centers. Costs associated with these logistics requirements should not be included in the proposal budget. Greater detail of field operations and requirements listed below will be requested by the logistics provider.

GREENLAND

Greenland field support requested? Yes ☐ No ☐

Operational base(s) required? Thule ☐, Kangerlussuaq ☐, Summit ☐
Other ☐(identify) _____

Number in field party _____ # of days in the field _____

Ski-equipped C-130 required? Yes ☐ No ☐
Approximate dates? _____

Twin Otter required? Yes ☐ No ☐
Approximate dates? _____ Number of hours requested? _____

Ground transportation requirements at field site? Yes ☐ No ☐
Vehicle Type? _____
Approximate dates?
Operating hours? _____

Yes ☐ No ☐
Air support requirements at field site?
Approximate dates? _____
Operating hours? _____

Remote field camp facilities requested? Yes ☐ No ☐
Camp location (coordinates) _____
Approximate dates? _____

ALASKA

Alaska field support requested? Yes ☐ No ☐

Operational base(s) required? Toolik Field Station ☐, Prudhoe Bay/Deadhorse ☐, Barrow ☐
Other ☐(identify) _____

Number in field party _____ # of days in the field _____

Ground transportation requirements at field site? Yes ☐ No ☐
Vehicle Type? _____
Approximate dates? _____
Operating hours? _____

Air support requirements at field site? Yes ☐ No ☐
Approximate dates? _____
Operating hours? _____

Remote field camp facilities requested? Yes ☐ No ☐
Camp location (coordinates) _____
Approximate dates? _____

OTHER ARCTIC LOCATION

Field support requested? Yes ☐ No ☐

Operational base(s) required? Yes ☐ No ☐
Identify _____
_____
_____

Number in field party? _____ # of days in the field _____

Ground transportation requirements at field site? Yes ☐ No ☐
Vehicle Type? _____
Approximate dates? _____
Operating hours? _____

Air support requirements at field site? Yes ☐ No ☐
Approximate dates? _____
Operating hours? _____

Remote field camp facilities requested? Yes ☐ No ☐
Camp location (coordinates) _____
Approximate dates? _____

VESSELS

Ship operations requested? Yes ☐ No ☐

Preferred ship? Alpha Helix ☐, USCG icebreaker ☐,
Other ☐(identify) _____
Area of operations? _____
Approximate dates? _____
Has ship operator been contacted? Yes ☐ No ☐

ADDITIONAL COMMENTS:

_____

_____

_____

_____

_____